

**REMARKS**

The Examiner's thoughtful attention to this application is sincerely appreciated.

**The Prior Art**

The Wachi et al. reference (5,056,400) discloses a musical instrument with an electro-acoustic transducer to generate musical tones. Some of the principal objectives of the Wachi et al. reference are to:

- A. Permit the **size** of a guitar or other musical instrument **to be reduced** to facilitate the use of the instrument and make it portable:

*"The portable musical instrument is required to have a compact main body in terms of easy carrying and easy standing performance. And a small-diameter speaker is disposed in the compact main body." Col. 1, lines 61 to 64.*

*"Some portable musical instruments include a resonator for producing a bass sound. However, the musical instrument of this type has a large main body like an acoustic guitar to obtain sufficient sound quality, and is not suitable for a standing performance. If the instrument of this type has a size suitable for a standing performance, sufficient sound quality cannot be obtained. Col. 1,*

1 lines 67, 68 and Col. 2, lines 1 to 6.

2  
3 *"The present invention ... has as its first object to provide a portable musical*  
4 *instrument which has dimensions suitable for portable use ..."* Col. 2, lines 1  
5 to 4.  
6

- 7  
8 B. Use a speaker to produce and Improve a **particular portion of the sound**  
9 **range** of a musical instrument, typically the **bass** sound range:  
10

11 *"It is a second object of the present invention to provide an*  
12 *electrical/electronic musical instrument which can improve a bass sound*  
13 *characteristic without particularly increasing outer dimensions or can reduce*  
14 *outer dimensions without impairing a bass sound characteristic ..."* Col. 2,  
15 lines 14 to 19.  
16

- 17  
18 C. **Alter** the structure of the faceplate of a conventional acoustic guitar body with  
19 a **wall** or **duct** to produce a new speaker "cabinet" or Helmholtz resonator:  
20

21  
22 *"In the portable electrical musical instrument [of Figs. 3(a) and 3(b)], the*  
23 *interior of a guitar body (instrument housing) 1 is partially partitioned for form*  
24 *a closed **cabinet** 5. A speaker unit (vibrator) 4 is mounted in a hole formed*  
25 *in a portion of a top plate 11 of body 1, which serves as one surface of the*  
26 *closed **cabinet** 5. A **duct** 6 which forms a Helmholtz resonator together with*  
27 *the closed **cabin** t 5 is arranged on the top plate 11."* Col. 9, lines 47 to 49;  
28

lines 52 to 54.

*"In this electrical musical instrument (Figs. 11 and 12), a small-diameter speaker unit is used in a so-called semi-acoustic guitar whose thickness is reduced to be smaller than that of a conventional acoustic guitar. A second **duct 6b** having a second opening port 9b is provided to a top plate 11 of a guitar body (instrument housing) 1 provided with a first **duct 6a** having a first opening port (sound hole) 9a.... This musical instrument is arranged and operated in substantially the same manner as the musical instrument shown in Figs. 3(a) and 3(b) except that the equivalent resistance  $r_p$  and the equivalent mass  $m_p$  shown in Fig. 5 are obtained by synthesizing those of the **ducts 6a and 6b** since the **ducts 6a and 6b** are provided in place of duct 6 of the musical instrument shown in Figs. 3(a) and 3(b)."* Col. 15, lines 18 to 25; 33 to 40.

D. **Center speakers on openings** formed in the guitar body:

*See Fig. 1, Fig. 4, Fig. 10, Fig. 11, Fig. 12, etc.*

E. **Center speakers in the sound hole.** In Wachi et al., auxiliary speakers openings are formed in the faceplate of the guitar. A speaker is not positioned in the sound hole 12 (Fig. 3(a)) of a guitar.

F. On a guitar, use the different vibrations of each of the **strings** (reference

1 character 2 in Figs.1, 3(a), 3(b), 10, 11, 12, etc.) to generate tones:

2  
3 *"In addition, a tone generating circuit 7 such as a pickup for converting a*  
4 ***mechanical or acoustic vibration of the tone generating device 2** into an*  
5 *electrical signal and a vibrator driver 8 for driving the vibrator 4 on the basis*  
6 *of the electrical signal supplied from the tone generating circuit 7."* Col. 7,  
7 lines 56 to 61.  
8

9  
10 *"In addition, a pickup (tone generating circuit) 7 for converting **a vibration of***  
11 ***each guitar string** (tone generating device) 2 into an electrical signal and a*  
12 *negative impedance generator (vibrator driver) 8 for driving the speaker unit*  
13 *4 are arranged."* Col. 9, lines 53 to 58.  
14

15  
16 *"A tone generating device 2 such as a membrane of a drum, **a string of a***  
17 ***guitar or the like**, a reed, or the like, for driving the Helmholtz resonator is*  
18 *disposed near the opening port 9a."* Col. 14, lines 31 to 35.  
19

20  
21 *"Furthermore, a pickup (tone generating circuit) 7 for converting **a vibration***  
22 ***of each guitar string** (tone generating device) 2 into an electrical signal and*  
23 *a negative impedance generator (vibrator driver) 8 for driving the speaker unit*  
24 *4 are arranged."* Col. 15, lines 27 to 31.  
25

26  
27 G. **Port sound outwardly** through openings formed in the guitar. Each of the  
28 speaker openings in Wachi et al. ports sound outwardly away from the guitar.

1 The Invention

2  
3 In contrast to the guitar disclosed in the Wachi et al. reference, the musical  
4 instrument of the invention is not concerned with:  
5

6  
7 A. **Reducing** the size of an instrument.

8  
9 B. Using a speaker to produce a **particular portion of the sound range** of a  
10 musical instrument. In Applicant's instrument, the speakers produce notes  
11 in the **entire** 80 to 1318 Hz sound range.  
12

13  
14 Recitation in Claims: The use in the invention of a speaker to produce notes  
15 in the entire 80 to 1318 Hz sound range is set forth in **Section (c) of**  
16 **Applicant's new Claim 6.**  
17

18  
19 C. **Altering** the structure of the faceplate and of the body of a conventional  
20 acoustic guitar body with a **wall or duct** to produce a new speaker "cabinet"  
21 or Helmholtz resonator: Applicant's invention makes use of the resonance of  
22 a conventional acoustic guitar body and does not install walls or ducts on the  
23 faceplate in an attempt to alter the guitar body to produce a new Helmholtz  
24 speaker--wall--duct resonator. Consequently, Applicant's instrument uses the  
25 faceplate and **hollow hourglass shaped body of a conventional acoustic**  
26 **guitar**, and the acoustic body in Applicant's invention must therefore have the  
27 **non-linear curvature and radii vector** discussed in the paragraph at the  
28

1 bottom of page 10 of the Specification. In contrast, Wachi et al. would be  
2 satisfied using the rectangular box illustrated in several of the drawings in  
3 their patent. Applicant's acoustic guitar body must also be able to **amplify by**  
4 **ten to one-thousand times each frequency in the range of 440 Hz to 1318**  
5 **Hz.** Since Wachi et al. is using a speaker to produce bass sounds and is  
6 modifying the structure of the faceplate of the acoustical housing to produce  
7 a speaker cabinet, it is unclear whether the Wachi et al. guitar will amplify the  
8 **entire sound range** (400 Hz to 1318 Hz) of notes in the manner of a  
9 conventional acoustic guitar.  
10  
11

12  
13 Recitation in Claims: The use in the invention of an acoustic body that has  
14 non-linear radii vectors and that amplifies any frequency of sound in the range  
15 of 440 Hz to 1318 Hz is set forth in **Section (c) of new Claim 6.**  
16

- 17 D. **Centering speakers on openings** formed in the guitar body. In Applicant's  
18 guitars, speakers are **offset** such that a portion of the speakers are in the  
19 sound hole and a portion of the speakers are offset from the sound hole to  
20 permit resonating sound to escape through the sound hole.  
21

22  
23 Recitation in Claims: The use of offset speakers in the invention is set forth  
24 in **section (d) of new Claim 3.**  
25

- 26  
27 E. **Placing speakers in faceplate openings formed away from the sound hol** .  
28 In the guitar of the invention, speakers are placed in or adjacent the sound

1 hole as can be seen in Figs. 1 to 3 of the application.

2  
3 Recitation in Claims: The use in the invention of speakers in and adjacent  
4 the sound hole is set forth in **section (d) of new Claim 3.**  
5

6  
7 F. Using the different vibrations of each of the **strings** (reference character 2 in  
8 Figs. 1, 3(a), 3(b), 10, 11, 12, etc.) to generate tones. In Applicant's invention  
9 the string are **muted** (Specification, p. 14, second paragraph), the **vibrations**  
10 **of strings are not used** to produce tones, and the strings function as  
11 switches in the manner, for example, illustrated in Figs. 4 and 5.  
12 Specification, paragraph spanning pages 14 and 15. Applicant's note tones  
13 are synthetically produced and do not rely on the vibration of strings.  
14

15  
16 Recitation in Claims: The use in the invention of muted strings is set forth in  
17 **section (b) of Claim 5.** The use of synthetically produced notes in  
18 combination with an acoustic guitar body is set forth in **section (e) of Claim**  
19 **5 and section (e) of Claim 6.**  
20

21  
22 G. Porting sound **inside** the guitar toward the acoustical guitar housing. In  
23 Applicant's guitar, port 47 (Figs. 1, 2, 3) is located inside the guitar and directs  
24 sound against (and not away from) the guitar body.  
25

26  
27 Recitation in Claims: The use of an internal port in the invention is set forth  
28 in **section (e) of Claim 4.**

1           The foregoing functions and structural features of Applicant's guitar are important  
2 because Applicant uses a **resonating acoustical guitar body to receive synthetic note**  
3 **tones** that are produced using a mathematical analog algorithm or digital file. Specification,  
4 page 3, second paragraph. The acoustical guitar body receives the synthetic note tones,  
5 resonates, and produces sound that **complements** the synthetic note tones produced by  
6 the speakers 41 to 43 (Fig. 3).  
7

8  
9           Accordingly, Applicant respectfully submits that the invention as set forth in  
10 the new Claims is not anticipate under 35 U.S.C. §102 by the Wachi reference.  
11

12  
13 The Specification  
14

15           Applicant has endeavored to amend the Specification as suggested by the  
16 Examiner.  
17

18 The Claims  
19

20  
21           Claims 1 and 2 are canceled, leaving new Claims 3 to 6. Specific features  
22 of the invention set forth in each new Claim are noted above in the discussion of the  
23 invention. A check is attached in the amount due for examination of two additional  
24 independent Claims.  
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26  
27  
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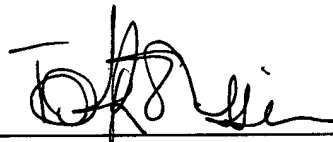


1 Drawings

2  
3 Formal drawings are submitted herewith along with a letter to the Chief  
4 Draftsman .

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7 If the Examiner finds merit in the foregoing remarks and amendments, it is  
8 believed the application is in condition for allowance and such action is earnestly solicited.

9  
10 Respectfully submitted,

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12 

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